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NOTEWORTHY COLLECTION

ARIZONA

LOPHOCEREUS SCHOTTII (Engelm.) Britton & Rose (CACTACEAE).—Yuma Co., Barry M. Goldwater Range-West (BMGR-West), Raven Butte 7.5′ USGS quad, 32.4741°, –114.0738° (WGS84), 210 m (690 ft) elevation, approximately 57 km ESE of Yuma, 5 October 2016, *R. P. O'Donnell with V. Luois, R. L. Harrow, and S. L. Arnett-Romero* (Desert Botanical Garden DES00083297). One individual approximately 5.6 m tall × 4.4 m wide, on sandy alluvium between the braids of Coyote Wash and approximately 90 m E of the main channel, in the Lechuguilla Valley, between the Copper and Gila Mountains, in lower Sonoran Desert habitat dominated by *Larrea tridentata* (DC.) Coville. BMGR-West is managed by the Marine Corps Air Station Yuma in Yuma, AZ.

Previous knowledge. This columnar, multiple-stemmed cactus is predominately found in Baja California, Sinaloa, and Sonora, Mexico. In the United States, this species occurs almost exclusively in Organ Pipe National Monument of southern Arizona (Parker 1989). Several individuals have also been reported approximately 5 km west of the western boundary of Organ Pipe National Monument in Bell Pass, Agua Dulce Mountains, Cabeza Prieta National Wildlife Refuge (Felger et al. 2014). Recently, two individuals were discovered near Corn Springs in the Little Chuckwalla Mountains, southeast California, the first record of this species in the state (Cloud-Hughes and Baker 2014). We describe the discovery of an individual *Lophocereus schottii* located a significant distance from previous records, in the Barry M. Goldwater Range-West. While the Barry M. Goldwater Range-West has been extensively surveyed for plants, including 656 sample sites and 5200 km of visual surveys (Malusa and Sundt 2015), this species had not been previously reported in this area, or anywhere in Arizona away from Cabeza Prieta National Wildlife Refuge or Organ Pipe National Monument.

Significance. This is the northernmost and westernmost occurrence of *Lophocereus schottii* in Arizona, representing a range extension within the state of approximately 100 km WNW from both Organ Pipe National Monument and from Bell Pass in the Cabeza Prieta National Wildlife Refuge. This record helps fill the 260 km gap between records from southern California and southern Arizona, being about 170 km from the former and 100 km from the latter.

While Cloud-Hughes and Baker (2014) suggested that the California individuals might have been planted as ornamentals in the last 50 yr, we think that explanation is unlikely for this individual. There are limitations to estimating the age of cacti due to significant variation in environmental conditions across sites (Drezner and Lazarus 2008), but data from long-term growth measurements of *Lophocereus schottii* on Organ Pipe National Monument (Parker 1988) suggest that this cactus is probably much more than 43 yr old, the approximate maximum age modeled by Parker (1988). Indeed, this individual, which is relatively large, presumably occurs in suboptimal conditions as it is at the edge of its range; whereas those individuals studied by Parker (1988) occur at the center of their distribution in Arizona and likely have faster growth rates due to more favorable environmental conditions. *Lophocereus schottii* is long-lived, living to approximately 75 yr (Shreve 1935). Given that this individual was large, old, and in a relatively remote location (17 km from the nearest residence in the town of Wellton and 3.4 km from the nearest dirt road) we consider it unlikely that it was recently introduced by humans.

The present discovery raises the possibility of a previously greater range of *Lophocereus schottii* and that this individual and those from Corn Springs and Bell Pass are relicts of a once more widespread population. Like most Sonoran Desert flora, *Lophocereus schottii* is frost intolerant, and its range has likely experienced southward contractions and northward expansions in response to geologic periods of climatic cooling and warming (Nason et al. 2002). In addition, populations of columnar cacti such as *Lophocereus schottii* are characterized by dramatic natural fluctuations in their numbers (Drezner and Lazarus 2008). Thus, relict individuals and relict populations are expected at the edges of this species' range.

Another possibility is that this individual was introduced to its present location via zoochory. Within the 50 km-long Lechuguilla Valley, Coyote Wash is a major corridor for both xeroriparian plants and wildlife between Sonora, Mexico and the Gila River, Arizona. Since the fleshy fruits of columnar cacti are attractants for animals including birds and mammals (Fleming and Valiente-Banuet 2002; Felger et al. 2014), it is possible that a *Lophocereus schottii* seed was dispersed by a migrating animal. In addition, Native Americans are known to have used and consumed the fruit of this species (Felger and Moser 1974). This cactus might descend from seeds accidentally dispersed by Native Americans, who were present in the area and used Coyote Wash from the late Pleistocene into historic times (Hartmann et al. 2012). Thus, this individual might represent either a relict of a once wider distribution, or a pioneer (or descendent of a pioneer) brought north decades or centuries ago by a dispersing human or other animal.

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